predicted by the Longley-Rice method, or in areas immediately adjacent to regions with less than predicted Grade B field intensity.

- -- In short, the sample of 14 homes in Fresno is heavily skewed toward locations not likely to receive Grade B field intensity rather than fairly representing the many PrimeTime 24 subscribers in the area west of the station's transmitter where Longley-Rice predicts that households can readily receive KJEO.
- 44. In Missoula, similarly, PrimeTime 24 has chosen a sample that overrepresents households that Longley-Rice predicts not to receive a signal of Grade B intensity
  from KPAX. (Although Longley-Rice predicts that only 11% of PrimeTime 24's subscribers in
  KPAX's Grade B contour do not receive a signal of Grade B intensity, three out of 13 homes
  tested, or 23%, are predicted not to receive a signal of Grade B intensity.) Because PrimeTime
  24 did not select a sample randomly, there is no way to know what results would have been
  achieved with a properly selected sample.
- 45. PrimeTime 24's testing of households that Longley-Rice predicts <u>not</u> to receive a signal of Grade B intensity is pointless. (These sites account for 10 of the 27 sites tested by PrimeTime 24's engineers.) Since Longley-Rice predicts that these households are unserved, proving that they are indeed unserved does not conflict in any way with my analysis.

# Mr. Culver's Flawed "Indoor" Measurements Cannot Be Used to Show that a Household Is Unserved

- 46. Mr. Culver chose to perform his testing, where possible, only <u>inside</u> the subscriber's home using the subscriber's own antenna, transmission line, and television set --however old that equipment might be, and however poorly it might function. (Although PrimeTime 24 has directed its experts to conduct outdoor tests in every instance in other cases, PrimeTime 24 apparently did not choose to conduct such tests here.) On those occasions in which they were able to go inside the subscriber's house, <sup>13</sup> Mr. Culver's engineers attempted to measure both the <u>inside the house</u> voltage from the transmission line attached to the outdoor antenna and to make assessments of picture quality. In some cases, Mr. Culver's engineers made videotapes using the homeowner's own antenna and transmission line.
- 47. It is impossible to measure accurately the field intensity that exists in the vicinity of the rooftop antenna <u>outside</u> the house -- which is what is relevant here -- by measuring the voltage <u>inside the house</u> from an antenna and associated equipment of unknown characteristics. The subscriber's equipment may not be functioning properly, or the antenna may not be oriented correctly. The use of "inside" measurements to work backwards to estimate the available signal strength in the air outside is like judging the amount of water that is going <u>into</u> a leaky hose by measuring how much water comes <u>out</u> the other end. With no way to estimate the

Mr. Culver's engineers were unable to take inside measurements at over half of the locations they visited. The inability of <u>PrimeTime 24's own engineers</u> to obtain cooperation from PrimeTime 24's own subscribers shows the wisdom of uniformly taking signal intensity measurements on the street.

leakage, measuring the output of a potentially leaky and inefficient system can only <u>understate</u> the amount of signal intensity (or water) that is being input to the system.

- the air above a household can affect the voltage received inside a subscriber's home from a rooftop antenna. These factors include the gain of the antenna; the condition of the antenna; the direction in which the antenna is pointed; <sup>14</sup> the presence or absence of a "balun"; whether the transmission line has been crimped or otherwise damaged; the presence or absence of corroded terminals; the transmission line type; the length of the transmission line; and the impedance matching of antenna to transmission line and transmission line to receiver. Additionally, signal leakage can occur, causing the signal ultimately received within the house to be significantly less than the signal received above the rooftop. Due to these unknown factors for which Mr. Culver has not controlled it is impossible to conclude from a "below Grade B" voltage reading inside the house, based on presumed system characteristics, that there is not a signal of Grade B intensity in the air above the house.
- 49. While Mr. Culver's inside measurements are likely to understate the signal intensity available above the rooftop at a particular location, those measurements do establish a lower bound for the actual signal intensity above the house. That is, if Mr. Culver's inside measurements show (even using the household's potentially defective equipment setup)

One of the senior engineers at an engineering firm retained by PrimeTime 24, Hammett & Edson, has specifically stated: "...I think it reasonable for [the station] to expect homeowners to orient their antennas properly." Correspondence from W. Hammett to R. Weller, dated Feb. 4, 1998 (PTN 003927).

that the signal above the rooftop is of greater than Grade B intensity, that result can be relied on.

I summarize below the significance of Mr. Culver's indoor findings in this regard.

#### Mr. Culver's Outdoor Measurements of Field Intensity

- unusual way, quite different from that approved by the FCC. Instead of using an antenna elevated to 30 feet, Mr. Culver used an antenna elevated to 15 feet -- even though his test antenna was therefore much lower than the household's own antenna in many cases. As a result, his outdoor measurements are likely to be a few dB lower than those that would be obtained by following FCC procedures. And instead of performing a mobile run of 100 feet as specified in 47 C.F.R. § 73.686, Mr. Culver had his engineers "slowly hand-carr[y the antenna] over a short 20 to 40 foot linear path." Culver Report at 5. By traveling along a shortened path, Mr. Culver collected fewer data points than had he used the full 100 foot path, making his data less reliable than they would be if he had followed the FCC procedures.
- 51. Despite these flaws, the results of Mr. Culver's testing are striking. Based on Mr. Culver's data alone, one can draw the following conclusions:
- a. In Missoula, Mr. Culver's measurements show that of the ten locations predicted by Longley-Rice to receive a signal of at least Grade B intensity at 30 feet, at least six do receive a signal of Grade B intensity, even at lower antenna heights of 15 to 25 feet.

  Mr. Culver's engineers measured at least three of these households (Locations Nos. 4, 6, and 13)

to receive a signal of <u>Grade A</u> intensity -- in one case (Location No. 6), more than 100 times stronger than Grade B intensity.<sup>13</sup>/

b. In Fresno, Mr. Culver's measurements show that of the seven locations predicted by Longley-Rice to receive a signal of Grade B intensity at 30 feet, three received a signal of Grade B intensity at the lower height of 15 feet, and it is highly likely that six out of seven receive a signal of at least Grade B intensity at 30 feet. 16/

### Supplemental Outdoor Testing in Missoula

52. In Missoula, Mr. Culver's engineers conducted most of their measurements on a "strictly indoors" basis. As a result, Mr. Culver's data cannot be used to conclude that there is not a signal of Grade B intensity in the vicinity of the rooftop at any of these locations. To remedy that problem, I arranged for a competent broadcast engineer, Charles Cannaliato, to make outdoor signal intensity measurements near the homes of several of the PrimeTime 24 subscribers tested by Mr. Culver's engineers in Missoula. The results Mr.

Exhibits 4 and 5 contain summaries of the available signal strength data about each of the 27 locations chosen by PrimeTime 24.

Grade B intensity for KJEO (Channel 47) is 64 dBu. Three households in Fresno (Nos. 4, 5, and 8) were measured just below Grade B intensity (63, 61, and 61 dBu respectively) at 15 feet. If Mr. Culver's engineers had measured at 30 feet, the signal intensity at these three households would very likely have exceeded 64 dBu, based on the linear height/gain function relied on by Mr. Culver (Report at 9) and often relied on by other broadcast engineers.

The result would probably be the same if one looked to the actual heights of the antennas at these houses. At Locations No. 4 and 8, the field notes of Mr. Culver's engineers indicate that the antenna is on a pole above the house; at Location No. 5, the field notes report that the household's antenna is at 28 feet.

Cannaliato obtained graphically illustrate the worthlessness of indoor measurements for assessing outdoor signal strength.

- 53. To resolve all doubts about methodology, I asked Mr. Cannaliato to conduct the measurements in a manner as close as possible to that employed by PrimeTime 24's engineers. I do not endorse these procedures, which are plainly less reliable than those specified by the FCC. To make the testing as parallel as possible to that conducted by PrimeTime 24, however, I decided to follow their procedures to provide "apples to apples" data for these specific households.
- 54. Like PrimeTime 24's engineers, Mr. Cannaliato attempted to gain access to the household's driveway whenever possible. And like PrimeTime 24's engineers, Mr. Cannaliato used an antenna lower than 30 feet -- an 18-foot antenna, roughly the height of the lowest rooftop antenna at the homes he visited. Mr. Cannaliato used the "cluster" method of testing, which the FCC has specified as an acceptable (although less desirable) backup to the 100-foot run method that we used in Miami, Charlotte, Pittsburgh, and Baltimore. See 47 C.F.R. § 73.686.
- 55. At or near each household, Mr. Cannaliato took a cluster of five readings. In each case, the first reading was taken by placing the antenna as close to the house as practicable (in most of the homes, the readings were taken in the driveway of the home) and orienting the antenna for maximum reading on the field strength meter. The antenna was then moved to a second spot, approximately four feet way, and a second reading was taken. This

process was repeated until five readings were completed. The median reading was then reconfirmed by returning the antenna to the spot where the reading was taken and remeasuring the signal.

56. Of the four homes predicted to receive a signal of Grade B intensity from KPAX that Mr. Culver's engineers claimed to have a "below Grade B" voltage inside the house, all four were measured to receive a signal of at least Grade B strength when tested outdoors using properly configured equipment. (The pertinent data are reprinted in the table below.) The large disparity between PrimeTime 24's inside measurements and actual outdoor signal intensity measurements confirms that inside measurements cannot be used to determine outside field intensity.

TABLE 2

Location (all in Missoula)	Culver Inside Voltage Measurement with Homeowner Equipment  (dBuV)	Outside Voltage Measurement with Equipment of Known Characteristics (dBuV) (median value)	Outdoor Field Intensity Measured with Equipment of Known Characteristics (dBu) (median value)
2	48.6	65.3	72.1
3	48.6	69.5	76.3
8	41.9	60.1	66.9
10	32.0	91.1	97.9

<sup>\*</sup> Culver claims 49 dBuV inside = Grade B.

<sup>&</sup>lt;sup>b</sup> Grade B = 49.2 dBuV for Channel 8 with this equipment.

Grade B = 56 dBu for Channel 8.

57. As this table shows, use of defective homeowner equipment can result in enormous losses of signal strength. At Location # 10 in Missoula, for example, the voltage that Mr. Culver's engineer's measured inside the house is only 0.1% of the voltage that can be achieved with a proper antenna setup -- even with the antenna at only 18 feet.

### Summary With Respect to Grade B Intensity at the Homes Picked by PrimeTime 24

- 58. The following is a summary of the relevant available data about the outdoor signal intensity available at the 27 households in Missoula and Fresno chosen by PrimeTime 24:
- -- Longley-Rice predicts that 10 of the 27 homes do not receive a signal of Grade B intensity. In two cases (Missoula Location No. 7 and Fresno Location No. 13), Longley-Rice under-predicted the signal intensity: the household actually does receive a signal of Grade B intensity from the local station in question.
- -- Of the 17 homes that Longley-Rice predicts to receive a signal of Grade B intensity at 30 feet, 12 received a signal of Grade B intensity when measured at heights ranging between 15 feet and 25 feet, and it is highly likely that 15 out of 17 receive a signal of Grade B intensity at 30 feet.<sup>12</sup>/

This is a conservative estimate, because it excludes one home at which PrimeTime 24's engineers measured a signal of Grade B intensity outdoors and Mr. Cannaliato measured a below-Grade-B signal. The location is in a canyon, at which (I understand) the local CBS station is willing to consent to satellite reception.

- 59. The relevant data about these 27 subscribers selected by PrimeTime 24 thus confirm that PrimeTime 24 serves many subscribers who receive a signal of Grade B intensity, and (as the data we have collected in a randomly sampled universe likewise demonstrate) that the PrimeTime 24 "do you receive an acceptable picture" screening process does not come close to limiting its subscribers to unserved households.
- 60. Remarkably, Mr. Culver's data also provides -- in a sample chosen by PrimeTime 24 itself -- strong confirmation of the accuracy of Longley-Rice in predicting actual field intensity. Using the "success rate" formula described above, at least 22 of the 27 locations, and in all probability 25 of the 27 locations, or 93%, are correctly predicted (or under-predicted) by Longley-Rice.

## Mr. Culver's Picture Quality Assessments Are Irrelevant to the Issue of "Grade B Intensity" and In Any Event Are Unreliable

in Fresno and Missoula, using the homeowner's own equipment setup whenever possible. The engineers also made videotapes from a line attached to the outdoor antenna at certain locations. Mr. Culver's picture quality observations are not relevant to the question of whether particular households can receive "an over-the-air signal of grade B intensity," as the SHVA specifies. I present the picture quality discussion below not because I believe it is relevant, but simply to ensure that, should Mr. Culver's picture quality evidence be considered, all of the relevant facts will be available to the Court.

- 62. As discussed above, picture quality is a subjective matter about which reasonable people can and do differ. In fact, viewing the videotapes of television reception at the 27 tested locations produced by PrimeTime 24, my personal subjective assessment of picture quality often differed from the ratings offered by PrimeTime 24's field engineers. (Because videotaping degrades picture quality to some extent, assessments of videotape picture quality are generally expected to be less favorable than assessments of the actual reception from the station.)
- 63. As discussed above, obtaining useful data about picture quality requires multiple neutral observers. I do not believe it is appropriate for the Court to rely on the picture quality assessments by the experts on either side of this case, because of the potential for bias. Indeed, to obtain truly reliable picture quality data, several neutral observers would need to view the reception from the station on-site, and not just on a videotape.
- 64. With those precautions, I will make the following observations about picture quality at these 27 sites:
- a. Of the seven Fresno locations predicted by Longley-Rice to receive a signal of Grade B intensity, Mr. Culver's own data indicate that, in the subjective evaluation of PrimeTime 24's own experts, two locations (Nos. 1 and 3) received perfect pictures and three locations (Nos. 2, 4, and 8) received good pictures.<sup>18</sup>/

At one of these seven locations (No. 6), Mr. Culver's engineers found that the station's signal was in fact much below Grade B. It is therefore not surprising that his engineers rated the picture quality at that site as poor.

- b. In Missoula, Mr. Culver's engineers tested four locations using their own properly configured equipment. Three locations (Nos. 4, 6, and 13) received pictures rated as good or passable by Mr. Culver's own engineers. The fourth location (No. 11) is in a canyon where, as noted previously, the station consents to satellite delivery.
- c. At the other six locations in Missoula that Longley-Rice predicts to receive a signal of Grade B intensity, Mr. Culver's engineers rated one location (No. 10) as receiving a good or passable picture using the homeowner's own equipment setup. As with field intensity, these observations using a homeowner's own (potentially defective) equipment represent only a lower bound of the actual number of these six households that could receive "acceptable pictures" (in the judgment of multiple neutral observers) using proper equipment.<sup>19</sup>/
- d. Because Mr. Culver's engineers made most of their videotapes in Missoula using the homeowner's own (potentially defective) equipment setup, Mr. Cannaliato made videotapes of KPAX programming at several of the Missoula sites using a properly configured antenna/transmission line/television system (at a low antenna height of 18 feet). The quality of these videotapes is often much better than the quality of the videotapes made by Mr. Culver's engineers using the household's own equipment -- reflecting the fact that the homeowner's equipment system is causing degradation in picture quality compared to what could be achieved from a proper setup.

For the record, although I do not suggest that the Court rely on my own subjective assessments, my judgment is that the videotapes taken by Mr. Culver's engineers suggest that some of the other eight locations also received acceptable pictures.

e. Should the Court wish to review it, I have arranged for creation of a videotape that contains, for each of the 17 homes that Longley-Rice predicts to receive a signal of Grade B intensity, either (a) footage recorded by Mr. Culver's engineers from a line attached to an outdoor antenna (if the footage was taken), <sup>20</sup> or (b) in certain locations in Missoula at which Mr. Culver recorded footage using the homeowner's own (potentially defective) equipment setup, footage recorded by Mr. Cannaliato using a properly configured equipment setup. In each case, I have arranged for the first minute of footage to be included. In most cases, my own assessment -- which I report simply to balance the observations made by Mr. Culver's engineers -- is that the picture quality on these videotapes is between passable and excellent. Because this tape represents a second or third (or greater) generation videotape, each generation of which introduces degradation of picture quality, the quality of the reception on a television at the site might well be even better than this videotape reflects.

I declare under penalty of perjury that my Expert Report, dated April 15, 1998, and the foregoing Supplemental Expert Report are true and correct.

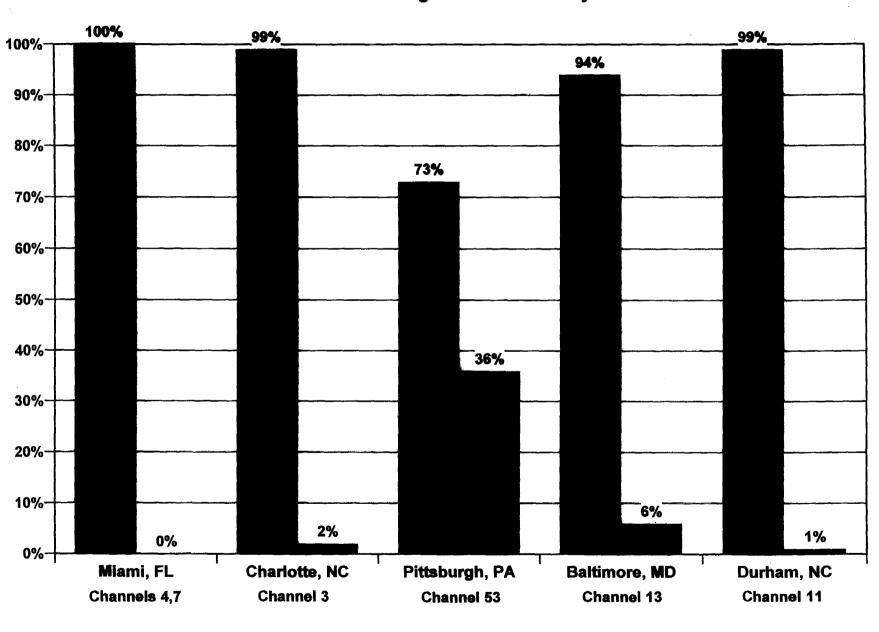
Executed on May 29, 1998.

Jules Cohen, P.E.

At three locations in Fresno (Locations Nos. 2, 3, and 4), Mr. Culver's engineers did not videotape any footage using a VCR connected to an outdoor antenna. They did take some footage using a camcorder pointed at a TV screen at those locations, but camcorder footage of a TV screen is worthless for purposes of assessing picture quality.

ALL-STATE\* LEGAL 800-222-0510 ED11

Success Rate of
Longley-Rice Method vs. PrimeTime 24 "Acceptable Picture" Method
in Predicting Grade B Intensity

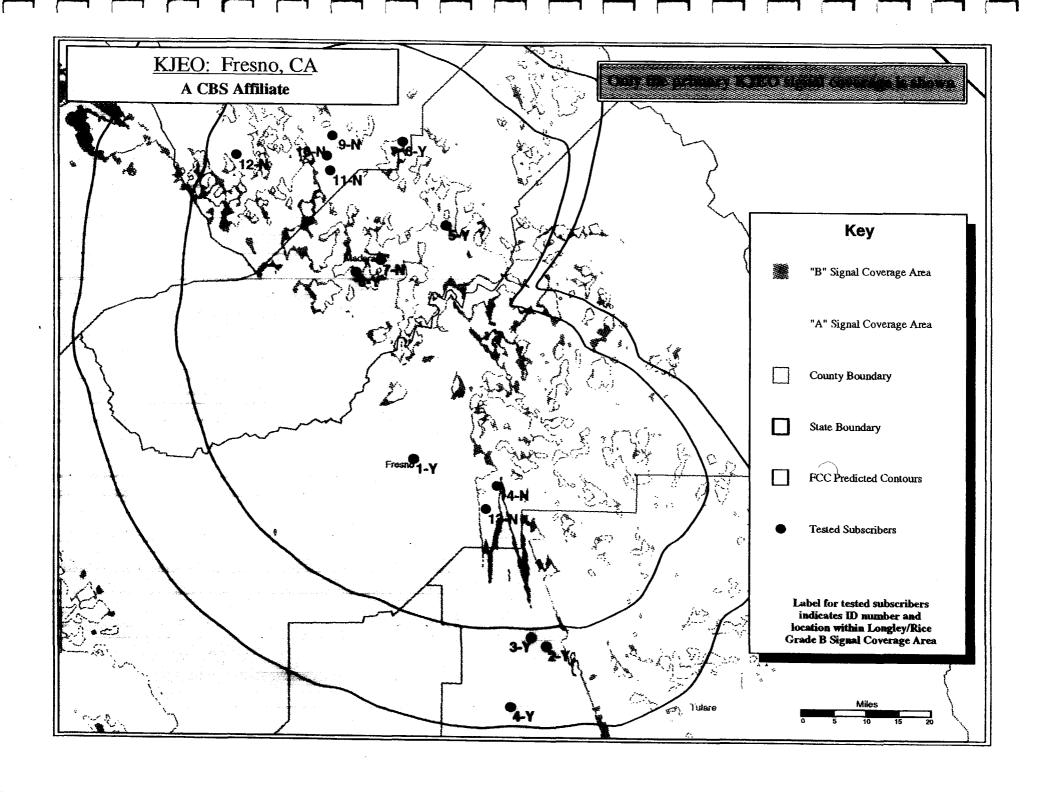


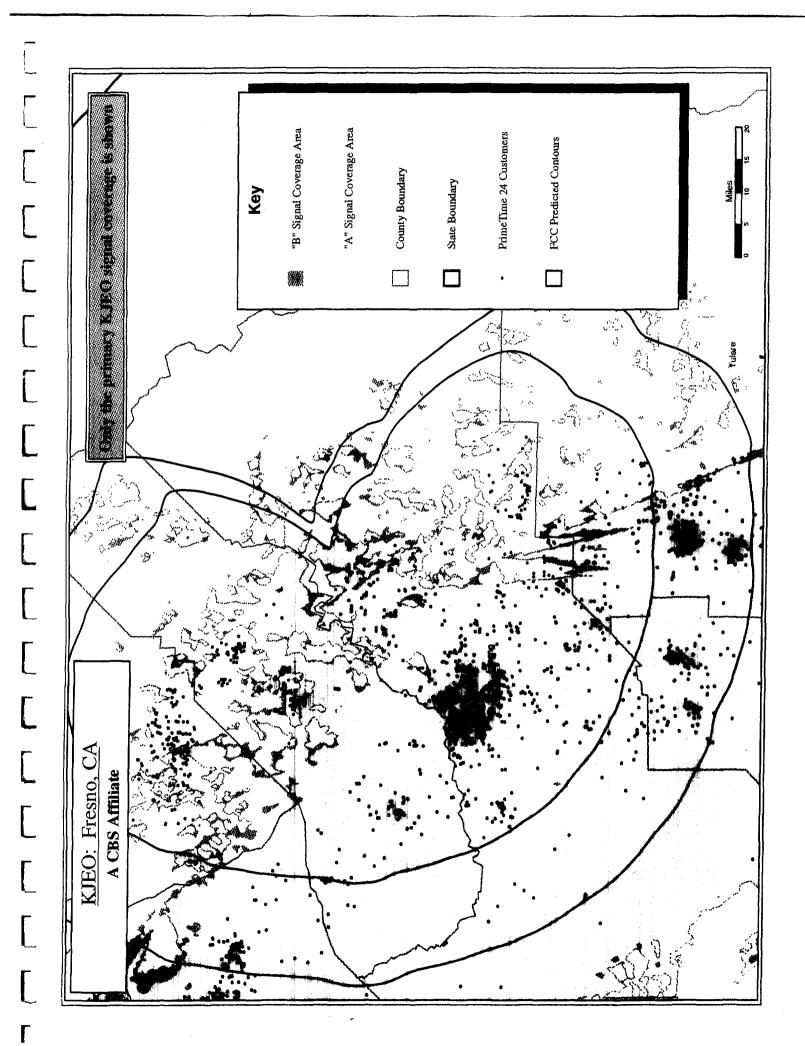
■ PrimeTime 24 Method

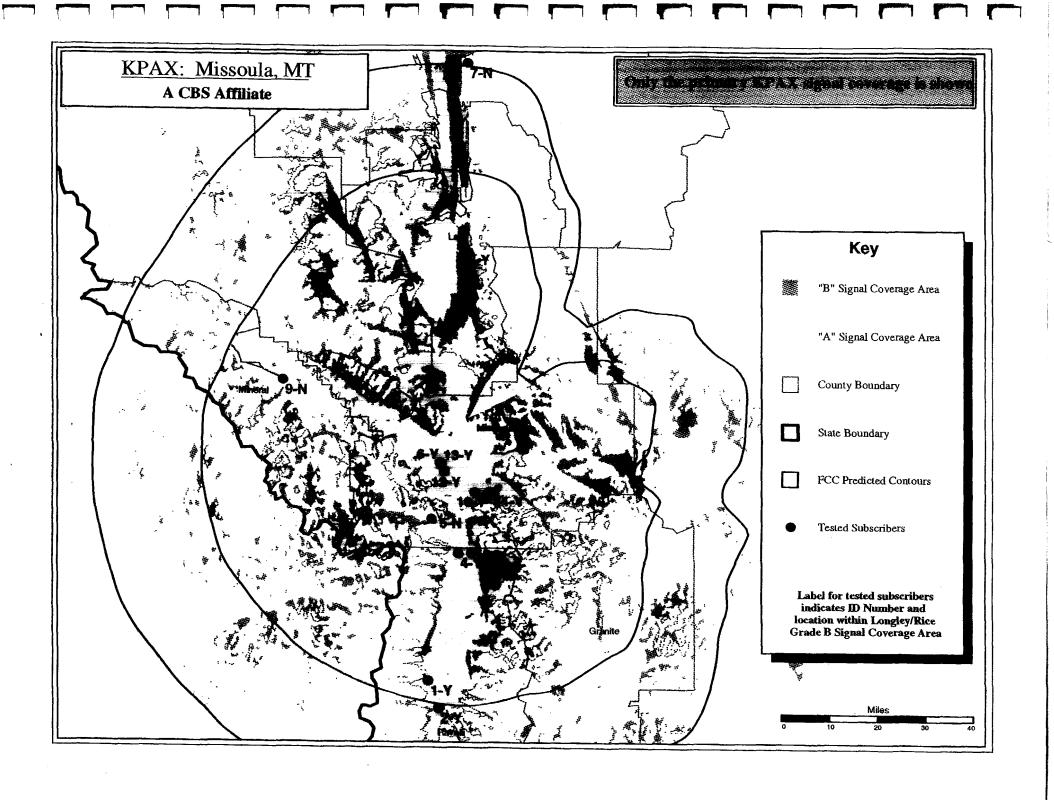
**■** FCC Longley-Rice Method

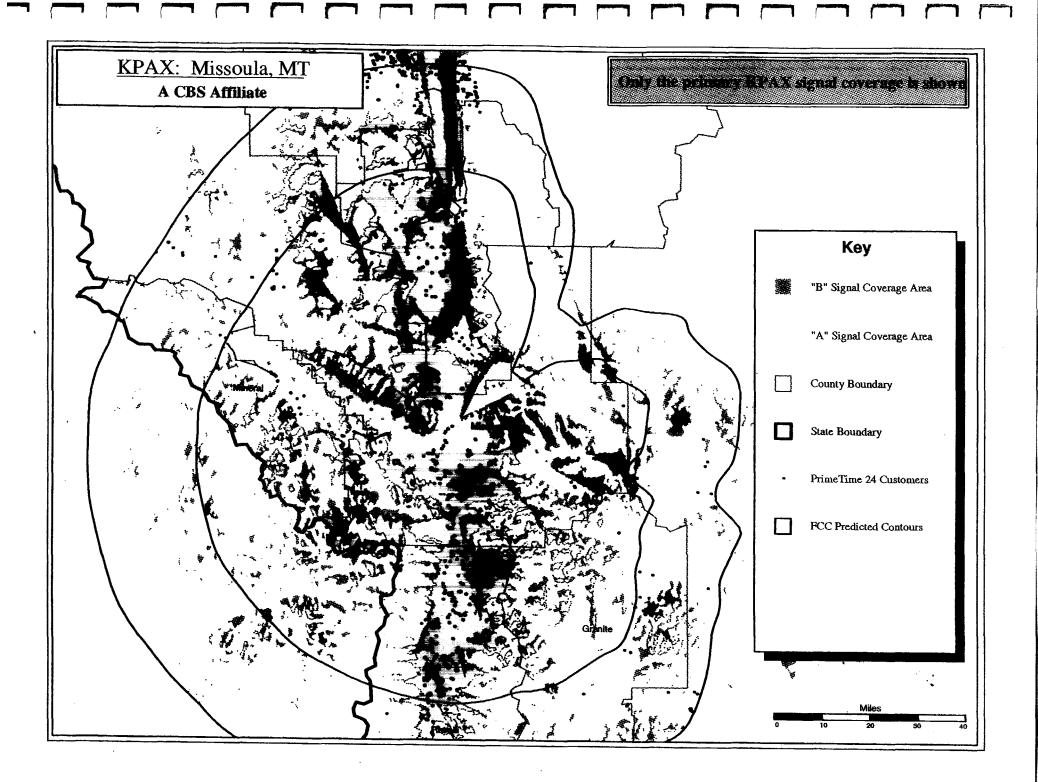
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## PT24 Fresno Test Sample

DMA	Loc	Contact	Address	County	Household Antenna Height	Miles to Trans- Mitter	Az.	Longley- Rice (for primary station)	Test Loc.	PT24 Rec. Input (dBuV)	PT24 Field Strength (dBu)
			2945 N. McCall,								
Fres.	1	J. Fanning	Sanger	Fresno	25' AGL	23	208	Υ	in	66	
			31192 Appaloosa								69
Fres.	2	R. Elder	Rd, Visalia	Tulare	tabletop	51.1	163	Y	out		(at 15 feet)
			32280 Rt. 132,							i	87
Fres.	3	G. Walter	Visalia	Tulare	35' AGL	50.6	165	Υ	out		(at 15 feet)
			922 E. Pleasant		pole (no						63
Fres.	4	J. Emerson	Drive, Tulare	Tulare	height listed)	61.9	178	Y	out		(at 15 feet)
			37661 Marina View								61
Fres.	5	R. Griswold	Dr., Bass Lake	Madera	28' AGL	17.6	342	Υ	out		(at 15 feet)
			1153 Silver Tip Ln.,								40
Fres.	6	J. Simpson	Fish Camp	Mariposa	n/a	30	336	Y	out	<u> </u>	(at 15 feet)
			32082 Big Sandy								50
Fres.	7	D. Woolman	Dr., Indian Lakes	Madera	n/a	18.4	303	N	out	<u> </u>	(at 15 feet)
			30394 Stetson Dr.,		pole (no						61
Fres.	8	F. Espino	Coarsegold	Madera	height listed)	21	294	Y	out		(at 15 feet)
1			5653 Cloud Rest,	į.	pole (no	1			)	]	51
Fres.	9	F. Siebert	Mariposa	Mariposa	height listed)	37.2	323	N	out		(at 15 feet)
1			4926 Hirsch Rd,				<b> </b> 		1	1	36
Fres.	10	M. Rogers	Mariposa	Mariposa	30' pole	39.5	313	N	out		(at 15 feet)
			3437 Windy Hollow	l						j	30
Fres.	11	C. Taylor	Rd, Mariposa	Mariposa	n/a	34.2	318	N	out	<u> </u>	(at 15 feet)
	į	}	5308 McCay Rd,						1		
Fres.	12	K. Clarote	Cathey's Valley	Mariposa	45' AGL	45	304	N	in	15	
			21293 E. American,					1		1	65
Fres.	13	G. Kyomoto	Reedley	Fresno	12' pole	27.9	178	N	out		(at 15 feet)
	]		1395 S. Crawford,	1				·			57
Fres.	14	S. Hacker	Reedley	Fresno	8' pole	24.8	174	N	out		(at 15 feet)

## PT24 Missoula Test Sample

DMA	Loc	Contact	Address	County	Household Antenna Height	Miles to Trans- mitter	Az.	Longley- Rice (for primary station)		PT24 Rec. Input (dBuV)	PT24 Field Strength (dBu)	Plaintiffs' Field Strength (dBu)
			355 Wyant Lane,			•						71.4
Miss.	1	W. Coward	Hamilton	Ravalli	17' AGL	54.5	190.6	Y	in	68.6		(at 18 feet)
			1440 Corey Lane,								}	72.1
Miss.	2	S. Pataka	Hamilton	Ravalli	20+' AGL	59.7	187.6	Υ	in	48.6		(at 18 feet)
			5518 River View,									76.3
Miss.	3	R. Glockner	Florence	Ravalli	18' AGL	25.7	180.9	Υ	in	48.6		(at 18 feet)
			412 Tie Chute Lane,								83.2	
Miss.	4	D. French	Florence	Ravalli	n/a	26.2	190.6	Υ	out	J	(at 15 feet)	
			14849 Neil Drive,									
Miss.	5	M. Free	Lolo	Missoula	17' AGL	20.7	206.3	N	in	35.6		
			11970 Mullen Road,								102.2	
Miss.	6	L. Holden	Missoula	Missoula	n/a	9.6	228.3	Υ	out		(at 15 feet)	1
			3237 Foothill Road,									63.4
Miss.	7	C. Porter	Kalispell	Flathead	20' AGL	79.7	359.3	N	in	39.1		(at 18 feet)
			36 Sky Lane,									66.9
Miss.	8	W. Fuchs	Ronan	Lake	20' AGL	39.6	357.4	Y	in	41.9		(at 18 feet)
			#4 Sportsman Club									
Miss.	9	D. Hunton	Rd, Superior	Mineral	20' AGL	41.5	286	N	in	20		
			608 Overlook Way,									97.9
Miss.	10	J. Odlin	Missoula	Missoula	23' AGL	12.8	179.5	Υ	in	32		(at 18 feet)
	-		4705 Lupine Road,							58.1		< 56
Miss.	11	M. Rubin	Missoula	Missoula	17' AGL	13.6	168.9	Υ	out	(at 15 feet)		(at 18 feet)
			11200 Kona Ranch									88.4
Miss.	12	M. Britzius	Rd, Missoula	Missoula	25' AGL	10.4	219.3	Y	in	73.6		(at 18 feet)
	-		12255 Mullan Road,								93.8*	
Miss.	13	L. Farra	Missoula	Missoula	n/a	9.8	229.9	Υ	out		(at 15 feet)	

<sup>\*</sup> Erroneously listed as receiver input in Mr. Culver's Report, Table 2. Page 1

## UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF FLORIDA

CBS Broadcasting Inc., et al.,	)	
Plaintiffs,	)	CIV-Nesbitt No. 96-3650
v.	)	Magistrate Judge Johnson
PrimeTime 24 Joint Venture,	)	
Defendant.	.)	
Determine.		

### Additional Declaration of Jules Cohen. P.E.

- 1. I have reviewed the Affidavit of Richard L. Biby, dated May 27, 1998, and the Rebuttal Expert Report of Richard L. Biby, dated May 28, 1998. In these documents, Mr. Biby advocates, as he did in his Expert Report, use of a 97% time factor and a 97% location factor in using Longley-Rice, as well as use of an assumed 20 foot, rather than 30 foot, household antenna.
- 2. In my Supplemental Expert Report, I discuss in detail the reasons I have relied on standard FCC procedures for creating Longley-Rice maps, rather than on the (to the best of my knowledge) unprecedented approach that Mr. Biby advocates. In this Additional Declaration, I point out, with a specific example, the serious inaccuracies that Mr. Biby's approach would create.